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COMPUTER SCIENCE NEWSLETTER

No. 74

Edited by Mr. C. Alan Ford

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THE SUGGESTION BOX

The suggestions still are coming to us in quantity. Over thirty individual items have come in since we summarized the eighteen items for the previous Newsletter. We continue here to abstract your suggestions and indicate our general reactions. The users who have so requested will be receiving our more detailed replies.

- Suggestion: may we have more sitdown keypunches, more vigorously enforced rules on the Express keypunches, more work-space and a better door on EUT...

  Reply: see NL 73! We're trying!

- Suggestion: Better turnaround, reinstate batch (leave your deck) service in the WATFOR terminals, add another terminal...

  Reply: System hardware has been a problem in early March, aggravating the problem of the the March peak load. Improvements here are at the highest of priority in UTCC.

- Suggestion: punched cards should be sold to users. The present waste is disgusting...

  Reply: this was tried and dropped last summer because of some very awkward problems for users and the administering agencies. It could happen next year, though, if users do not act responsibly.

- Suggestion: add Syntax checkers to CPS for CPS/RJE jobs.

  Reply: this is under study by our Interactive Systems team.

- Suggestion: reduce minimum region size from 70K...

  Reply: there is an active effort to do this.

- Suggestion: permit personal pickup of output from Post Office ranks...

  Reply: rent a return Post Office box or see next suggestion...

- Suggestion: be more secure and careful in handing back users' work...

Reply: we will persevere. Present arrangements reduced problems in this area to a trickle from a deluge when pickup was open. Our apologies for any lapses by the staff.

- Suggestion: improve Post Office service and install late-night buzzer...

Reply: changes are to be made soon to help in this area.

- Suggestion: in published JCL adopt the convention of printing user-supplied names in lower case for clarity. Make the JCL be correct...

Reply: our internal documentation standards are being sharpened and this will be seen in subsequent SSB's, Newsletters, and reference works.

- Suggestion: put PL/I Version 5 into the systems...

Reply: it has been done.

- Suggestion: do system testing after midnight...

Reply: the scheduling of test time is under review... forever so, it seems! Many factors must be considered in achieving a good balance between our use of the time and the loss of utility to the users. It is easier to find a worse balance than a better one, but we're still looking at it.

- Suggestion: publish class size information more clearly in the Input Room...

Reply: attempts have been made to improve this. Watch especially for a pocket sized Users Guide soon to be available.

- Suggestion: get more and better advisors, including on Saturday...

Reply: this specific staffing problem is under review by UTCC management.

- Suggestion: chain the manuals to the advisors' desks, so that they will be where they are needed...

Reply: this is in the works.

- Suggestion: publish credit request statistics in the Newsletter...

  Reply: see New Feature in this Newsletter.

- Suggestion: add the transparency feature to the remote model 20 terminals so as to handle the full EBCDIC character set...

  Reply: this is being studied by our Planning Manager and a discussion of it will be published later.

- Suggestion: publish backlog data more frequently on weekends...

  Reply: will be done to weekday standards.

- Suggestion: service the PDP8/s better to reduce horrible random errors...

  Reply: this is being studied further, since we believed we had solved this.

- Suggestion: use white cards instead of green for punched output...

  Reply: the real problem is warpage, not color. We are adjusting our storage provisions to help solve this problem.

Our thanks go to W. O. Mustard, R. Kinread, R. Rao, H. Ross, D. C. Brady, J. Bloodworth, J. Metzger, G. Cervinka, G. Wilkes, J. Peters, L. Bergeron, C. Truax, P. Chong, P. Cheu, D, Fewings, R. Griffin, M. Grushcow, C. Le, D. Barnard, B. Hayes, and good old Anon.

STAFF DEPARTURES

Bill Cosburn, long a mainstay of our system programming staff, has departed for the exciting prospects offered by the new Canadian Development Division of Control Data Corporation. May all success attend Bill in his new position.

Barbara Ablett will be lost to our operations group by March monthend. She moves with her husband to Ottawa.

MANAGEMENT CHANGES

The Manager of Operations since March 1 has been Dr. Dave McNaughton, late of the University of Waterloo Computer Centre. Dave brings to us his experience and his drive at making Operations responsive to the needs of the users, thus continuing what we have been working to make a tradition of UTCC.

Mr. Alan Wickens moved to the management of our System Programming effort, replacing Mr. Dick Swenson who moves back to the vacant post of Planning Manager.

These moves bring our management staff to its full budget level. Together with the recently designated supervisors of several key service areas...Interactive Systems, IBM 7094 II Services, the High Speed Job Stream...the managers should help provide the surpassing services you expect of UTCC.

SHARE XXXVI, LOS ANGELES

Five members of the UTCC staff and Jim McBride of the Computer Research Facility attended the thirty-sixth SHARE session held in Los Angeles from March 8 through 11.

Alan Wickens presented a paper to an open session on Operations, Structure and Function. Al Ford chaired a session on Job Submission and Retrieval Techniques at Universities, with a panel representing M.I.T., Stanford University and Ryerson Polytech. Dick Swenson led a Birds-of-a-Feather session on conversational remote job entry techniques. Nick Trufyn made further contributions to the FORMAC project.

All participants were widely pleased with the presentations and background information available at this conference.

The next SHARE will be in New York City in August.

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Barron, D. W.
Assemblers and loaders. 1969.

Bernstein, N.
An interactive general purpose computer animated two-dimensional movie system with real-time viewing capabilities, implemented on a small machine. 1970.

Chenevert, Pierre.
The Star-Ring system software. (M.Sc. thesis) 1970.

Conference on the Numerical Solution of Differential Equations, Dundee, Scotland, 1969.
Conference on the numerical solution of differential equations. 1969.

Flores, Ivan.
Data structure and management. 1970.

Forsythe, A. I.
Computer Science: FORTRAN language, by A. I. Forsythe et al. 1970.

Gauthier, R. L.
Designing systems programs. 1970.

Haist, L. A.
Complexity of parsing algorithms. 1971. (M.Sc. thesis)

Information Processing Association of Israel
Proceedings of the National Conference on Data Processing, 1969. Jerusalem.

International Conference on Combinatorial Mathematics, July 1970.
Proceedings. Ed. by A. Gewirtz and L. B. Quintas.

Lee, C. J. C.
Source to source translation. 1971. (M.Sc. thesis)

Manning, W. A.
A FORTRAN IV problem solver. 1970.

Metzger, J. K.
Monitoring computing systems. 1970. (M.Sc. thesis)

Middleton, Robert G.
Computers and artificial intelligence. 1969.

Stacy, R. W., ed.
Computers in biomedical research, v.3. 1969.

Sterling, T. D.
Computing and computer science: a first course with FORTRAN IV. 1970.

Sterling, T. D.
Computing and computer science: a first course with PL/I. 1970.

Symposium in Applied Mathematics, Durham, N. C., April 1968.
Numerical solution of field problems in continuum physics. Ed. by G. Birkhoff and R. S. Varga. 1970.

Symposium on Computer Processing in Communications, New York, 1969.
Computer processing in communications. 1970.

Van der Meulen, S. G.
Informal introduction to ALGOL 68, by S. G. Van der Meulen and C. H. Lindsey.

Weissman, Clark.
LISP 1.5 primer. 1967.

Wilkes, G. J.
A reorganization package for multi-level files. 1971.

Yee, Albert K. S.
Some techniques for the synthesis of music. 1971 (M.Sc. thesis)

SSBs ISSUED

8:71	New Format for CPS/RJE JOBNAME
9:71:1	Locally Submitted Jobs Run on S/360 No. 2
2	Use of REGION Parameter
10:71:1	A count of the use of catalogued procedures
2	Correction to Newsletter No. 73
11:71:1	Larger WATFOR region for High Speed Job Stream
2	Version 5 of PL/I now available
3	Scientific Subroutine Pakcage routines BESJ and EIGEN
4	ALGOLW 305 abends
5	Changes in Procedure Library delayed
12:71:1	Problems with data access methods on System 360 No. 2
2	Utility Program IEHLIST
3	Correction to Newsletter No. 73
13:71	Revised version to tape specification program SPEC

SPECIAL INPUT DATA ACQUISITION SYSTEMS

Staff members of UTCC are sometimes asked to advise users upon how to manage the preparation of raw input data by means other than punched cards. Paper tape and other media are being used or contemplated. Computer users are well advised that careful planning of input acquisition systems may permit much better service through the subsequent production runs on the computer systems.

In this regard we wish to remind you that the Computer Research Facility holds some unique equipment and knowledge which might well be exploited in the development of acquisition systems. UTCC will be pleased to assist in projects which might involve the services of CRF. See Mr. Clyde Stevens (928-8853) for further information.

MORE COURSES ON THE USE OF SYSTEM/360 COMPUTERS

For some time the Centre has been investigating methods of providing users with more formal instruction on the use of our computers. As part of this effort we have been looking at some material which is available in the form of either films or videotapes. These investigations have been carried out with other Ontario Universities, through the auspices of a special interest group on Training Resources of the Computer Coordination Group (C.C.G.) of the Committee of Presidents of the Universities of Ontario.

In particular the C.C.G. has been studying a set of films and video tapes which can be leased from a firm called Edutronics. A fairly extensive sample of their products was demonstrated here in January and invitations to view them were sent to Departmental Representatives, with several of them or other interested persons attending. At present a tentative agreement has been reached between the C.C.G. and Edutronics for the rental of material to be used in the Ontario Universities.

It has been hoped that the first material would be available early in April but budgetary problems have prevented C.C.G. from finalizing the agreement at the time of writing.

The Computer Centre has set up a tentative schedule of courses, utilizing some of this material, with topics to be covered in the next few months to include FORTRAN, Introduction to O/S concepts, JCL and programming techniques. In addition to giving formal presentations, we are attempting to make arrangements so that the material will be available for small groups or individuals to view it at mutually convenient times. It should also be possible for departments to borrow films or tapes to arrange their own lectures, but there will be a charge for this option.

When more information becomes available we will notify departmental representatives and other interested persons. Anyone wishing to receive further information is asked to contact either Mrs. C. Davidson, Room S.F. 115A, phone 928-8599 or Mr. R. Williams, Room S.F. 128, phone 928-2694.

CREDIT REQUEST SUMMARY

We have been asked to publish credit request information in the Newsletter. Here goes!

The table below summarizes the number of credits granted, broken down by system and by classification. To illustrate the broad mix of problems, the table is followed by a more detailed summary. Our corrective efforts naturally will focus on the more common faults.

The number of credits represents about 0.5% of the volume of jobs. The dollars credited amount to almost 1.0% of billings. This reflects a known tendency for claims not be made for short jobs.

	S/360	7094	Other (PDP-8, Calcomp etc.)	TOTAL
HUMAN	51	4		55
SOFTWARE	17	5	12	34
HARDWARE	3	8	1	12
TOTAL	71	17	13	101

CREDIT REQUESTS IN DETAIL

SYSTEM/360

Human

a.	Lost print or punch output	23 cases
b.	Jobs run twice or on wrong system	9 cases
c.	Scratch packs full	4 cases
d.	Input decks shuffled or damaged	3 cases
e.	Jobs cancelled in erorr to allow for fixed schedule computer maintenance	3 cases
f.	Wrong print chain used	2 cases
g.	Wrong printer form mounted	2 cases
h.	360 Operator tape error	1 case
i.	Operator overprint error	1 case
j.	Conflicting demands for a single user tape	1 case
k.	Improper USG advice	1 case
l.	System Catalogue not restored	1 case
		51 cases

Software

a. OS Processor and Utility bugs	8 cases
b. User Jobs running in LCS on CPS abend	7 cases
c. Transient OS Software Bugs	2 cases
	17 cases

Hardware

a. Decks improperly duplicated or badly punched	3 cases
System 360 Total	71 cases

IBM 7094

Human

a. DATATEXT not run properly	4 cases

Software

a. 7094 IBLDR/OVERLAY Failures	2 cases
b. 7094 Monitor overwrite	2 cases
c. 7094 Clock Error	1 case
	5 cases

Hardware

a. 7094 tape errors	6 cases
b. 7094 Card Reader errors	2 cases
	8 cases
7094 Total	17 cases

OTHER ERRORS

Hardware

a. PDP-8	1 case

Hardware/Software

a. CALCOMP	12 cases
Total	13 cases

PRODUCTION DATA

The usual February upsurge of work failed to occur for all but the High Speed Job Stream. The lack of growth was unexpected considering that the increased core on S/360 #2 certainly made a large increase possible.

The loss of work on the 7094 may in part relate to it being out of service for moving the 1401 to New Physics. Despite the reduction of 32% in number of jobs, however, the billed time dropped only 15%. Our objective of a 7094 completely busy on relatively few jobs may be shaping up after all.

The minor increase in student work leaves the February figure well below the record of 96,992 jobs spun through in November 1970. At the moment of writing (mid March) we are aware of a major upsurge in work at the ASUT and EUT which should surpass the November peak.

System	Dec.	Jan.	Feb.	Feb./Jan.%
S/360	17868	16536	16444	99%
7094	1429	1533	1042	68%
HSJS	47486	58527	65888	112%
TOTAL	66783	76596	83374	109%

TABLE I: No. of Jobs Processed, Dec. 70; Jan./Feb. 71

System	Feb. 70	Feb. 71	1970/71 Change
S/360	12457	16444	+32%
7094	3324	1042	-69%
HSJS	55776	65888	+18%
TOTAL	71557	83374	+16%

TABLE II: No. of Jobs, Feb. 71 Compared with Feb. 70

USER RESPONSES TO BETTER THROUGHPUT

The addition of more core onto S/360-65 No. 2 has increased our turnaround and throughput capacity. Although there has been no radical upsurge in total work load, there has been an interesting shift in the load in the different service levels and between the computers.

The following table illustrates the trends for System No. 1. Rush and ASAP classes are well down and IOI classes are up.

The total job load dropped on System No. 1 by 19% while the billable time dropped only 7%. On System No. 2 the number of jobs jumped by 79% and the billable time by 92%.

Average job times are also well up on both systems, a good result of the extra capacity. A typical job in System No. 1 runs 2.1 minutes of formula time and in System No. 2 runs over 1.7 minutes.

The addition of extra core memory has thus provided more throughput at better turnaround and greater economy.

SHIFT IN SERVICE CLASS LOADS

System No. 1

Classes	Jan.	Feb.
R,S	3119	652
A,B,E	6640	3730
I,J,M	1654	3480
All others	1588	2646
TOTALS	13001	10508

SYSTEM RELIABILITY

The reliability of the S/360 systems in February is shown in the following table, with January data shown for comparison.

SYSTEM	MONTH	UPTIME	MTBF
S/360 #1	January	94.6%	8.9 hrs.
	February	93.6%	9.3 hrs.
S/360 #2	January	97.9%	15.8 hrs.
	February	94.1%	6.8 hrs.

Uptime decreased slightly in System #1, caused by continued problems in the Multiplexor Channel. These appear to be resolved at the end of February.

Uptime likewise dropped somewhat in System #2. Equipment and power problems at ASUT and some software system problems contributed. However, the drop in mean time between failures was much more serious than the loss of uptime, since it degraded service to the High Speed Job Stream to well below UTCC standards.

Although these problems seem to have been corrected, early March performance has been hurt by other problems which will be reported in the next Newsletter.

HIGH SPEED JOB STREAM SERVICE

WATFOR Update

On March 3, 1971 the WATFOR compiler, available to users of the EUT/ASUT High Speed Job Stream Service, was updated to make 40,000 bytes of core available as work area to each job (Reference: SSB 11:71:1). This value is exactly double the old figure of 20,000 bytes, and is in line with the monitor region increase to 150K made on February 10, 1971 (Reference: SSB 6:71:1).

WATFIV VIL2

Further to the High Speed Job Stream Service item in Newsletter #73, work is still progressing on the WATFIV VIL2 compiler and its implementation is imminent. As mentioned previously, an SSB will be issued announcing the availability of this compiler, at the appropriate time.

It should be noted:

a. that the WARFIV compiler will be supported at EUT/ASUT in addition to the WATFOR compiler and

b. that the Direct-Access I/O feature, mentioned in Newsletter #73, will not be implemented on the WATFIV compiler available to EUT/ASUT.

VERSION 5 OF PL/I PROCESSOR

Version 5 of the Pl/I processor has now been implemented on both System/360's. Improvements in Version 5 include additional string handling functions, halfword binary features and options allowing different levels of optimization. Further details of the improvements may be found in the manual PL/I(F) Version 5 Planning Guide (IBM Form No. GC33-0002-0, as updated by Newsletter GN33-6014). All versions of the Pl/I(F) Language Manual with Form Nos. GC28-8201-2 and up will also contain descriptions of these features.

Because Version 5 utilizes a different library than earlier versions, it is likely that program modules created by earlier versions will not work properly when linked to modules created by Version 5. At present Version 5 is available as an additional processor and users have the choice of compiling source program by either Version 4 or 5. However, it is expected that Version 5 will be the standard version of PL/I when Release 19 of the Operating System is implemented.

At present Version 5 of PL/I may be accessed through the procedures PL1V5LDG for compile, load and go, and PL1V5CLG for compile, linkedit and go.

TECHNICAL TIPS

USING ON-LINE PROGRAM LIBRARIES (TIC014/TIC069)

1. Obtaining Authorization for On-Line Storage

Any use of space on user-dedicated, on-line packs must be registered with the Authorization Services Section of UTCC (see p. 3-27 ff. of the Users' Reference Manual). After authorization has been received, USG will allocate the requested amount of space on the on-line pack.

2. Adding/Replacing an Entire Load Module

Use a catalogued compile and link-edit procedure and override the SYSLMØD DD card as follows:

```
//LKED.SYSLMØD   DD DSN=name(member),
//   DISP=ØLD,UNIT=2314,VØL=SER=serial,
//   DCB=(RECFM=U,BLKSIZE=7294),SPACE=blank
```

In the above and all following examples, 'name' should be replaced by the name given to the partitioned data set when authorization was received to use the space, 'member' should be replaced by the name given to the program, and 'blank' indicates that no operands are to be coded after the '=' sign.

3. Executing a Load Module From A Library

The following will execute a load module directly from a program library:

```
//stepname EXEC PGM=member,REGIØN=nnnK
//STEPLIB DD DSN=name,DISP=ØLD,
// UNIT=2314,VØL=SER=serial
```

4. Replacing Part of an Existing Load Module

The following illustrates how to revise an existing load module: in this case, replacing one of several FØRTRAN SUBRØUTINES of a program by a different version.

```
//stepname EXEC FØRTGCL
//FØRT.SYSIN DD *
    )
    ) source deck of SUBRØUTINE to be replaced
    )
```

```
/*
//LKED.SYSLMØD DD DSN=name,
// DISP=ØLD,UNIT=2314,VØL=SER=serial,
// DCB=(RECFM=U,BLKSIZE=7294),SPACE=blank
//LKED.SYSIN DD *
   ENTRY MAIN
   INCLUDE SYSLMØD(member)
/*
```